

# Environmental Monitoring Program

## D-1641 Compliance



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# Overview

- Background
- Ecosystem Water Quality Monitoring
  - Discrete
  - Continuous
  - Dissolved Oxygen
- Biological Monitoring
  - Zooplankton
  - Phytoplankton
  - Benthic



# Background

- The Environmental Monitoring Program was created in 1971 and is a member of the Interagency Ecological Program.
- Ensures compliance with water quality objectives
- Collects physical, chemical and biological data
- Produce an annual report Summarizing our findings

State of California  
The Resources Agency  
Department of Water Resources  
Division of Environmental Services

## **Water Quality Conditions in the Sacramento-San Joaquin Delta and Suisun and San Pablo Bays during 2008**

Report to the State Water Resources Control Board in  
Accordance with Water Right Decision 1641



September 2009

Arnold Schwarzenegger  
Governor  
State of California

Mike Chrisman  
Secretary for Resources  
The Resources Agency

Lester A. Snow  
Director  
Department of Water Resources

# Background

- Maintains 42+ years of data, ensures quality, and makes it available to the public

- Conducts special studies when resources allow

Bay-Delta Monitoring and Analysis Section - Windows Internet Explorer

http://www.water.ca.gov/bdma/

CA .GOV DEPARTMENT OF WATER RESOURCES

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Climate Change and California's Water | Delta Initiatives | Drought | IEP | All Environment Topics...

**Bay-Delta Monitoring & Analysis Section**  
Environmental Monitoring Program

**MONITORING**

Photo credit: Jodi Evans

**Bay-Delta Monitoring and Analysis Section**

Welcome to the **Bay-Delta Monitoring and Analysis Section** of DWR. Our primary task is monitoring and data analyses to further the Department's understanding of estuarine ecology and to provide information useful for the management and conservation of the upper San Francisco Estuary.

We are an integral member of the **Interagency Ecological Program (IEP)**, and comprise most of the IEP's **Environmental Monitoring Program (EMP)**. The IEP is a group of State and Federal agencies, as well as university and private scientists, who conduct long-term monitoring and applied research in the San Francisco Estuary.

We also develop partnerships and collaborations through the **Interagency Ecological Program**, the **CAI FFD Science Program** and the **Bay-Delta Science Consortium** that foster interdisciplinary monitoring and analysis studies.

Environmental Water Quality Estuarine Studies Program  
EWQES

**BDMA Home**

**ACTIVITIES**

- Staff
- Meta Data
- Publications
- GRTS
- Research Vessel San Carlos
- Published Reports
- Field Observations

**RELATED LINKS**

- DES
- EWQES
- OWQ
- AES
- RTM
- SSR

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Back to Top | Help | Comments or Suggestions | Document Viewers

## Meta Data Index

### IEP Bay-Delta Monitoring and Analysis Section

This program is an interagency effort that consists of the following five components:

1. [Discrete Water Quality](#) -- [Brienne Noble](#)
2. [Benthic](#) -- [Dan Riordan](#)
3. [Phytoplankton](#) -- [Tiffany Brown](#)
4. [Zooplankton](#) -- [April Hennessy](#)
5. [Continuous Water Quality](#) -- [Mike Dempsey](#)

These five program components comprise the monitoring required by the State Water Resources Control Board's Water Right Decision 1641, and each have [monitoring site locations](#).



Click on the map to zoom in and select a monitoring station by clicking on the station code on the map.

- <http://www.water.ca.gov/bdma>

- <http://www.water.ca.gov/iep/activities/emp.cfm>

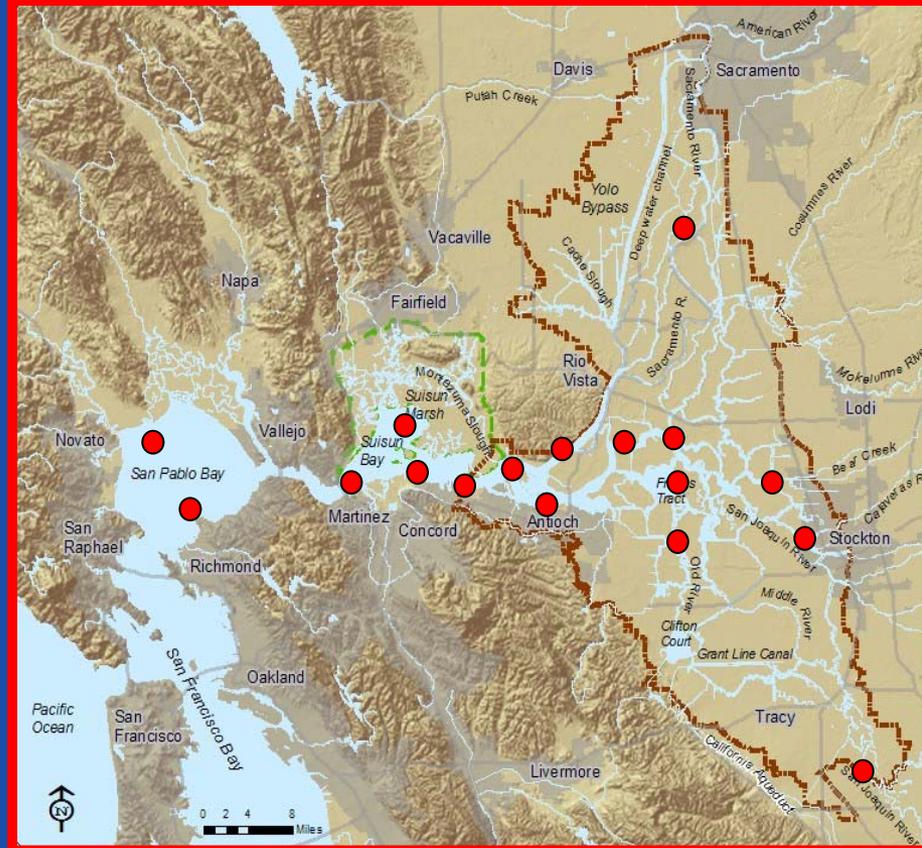
# Ecosystem Water Quality Monitoring

- Discrete
- Continuous
- Dissolved Oxygen Monitoring



# Discrete Water Quality Monitoring

- Discrete samples are taken monthly at 17 sites at high slack tide



Monthly Sampling Locations

- All data is available from Brianne Noble at [BNoble@water.ca.gov](mailto:BNoble@water.ca.gov)
- Data format is excel spreadsheet
- Metadata is available at <http://www.water.ca.gov/bdma/meta/>

# Discrete Water Quality Monitoring

## Parameters:

### Field Measurements

- Water Temperature
- Conductivity
- Dissolved Oxygen
- Secchi Disk Depth
- Turbidity
- Fluorescence
- pH\*

### Laboratory Analysis

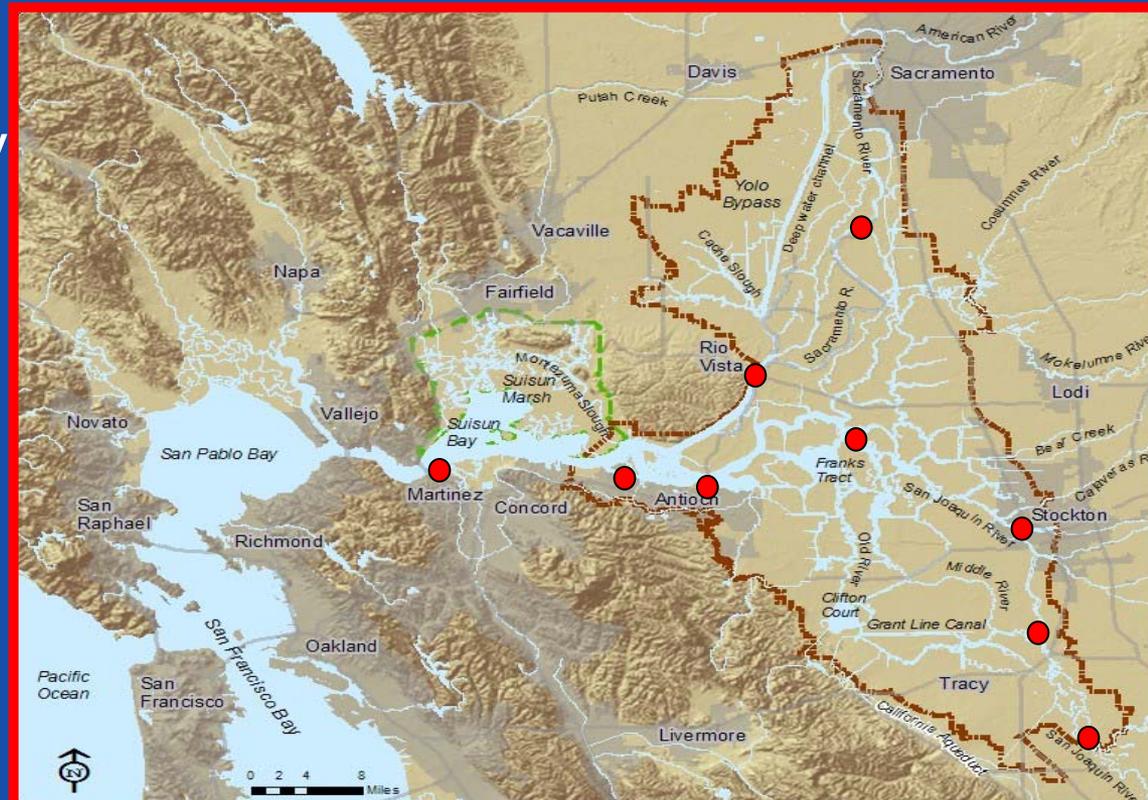
- Pheophytin
- Kjeldahl Nitrogen
- Dissolved Inorganic Nitrogen
- Dissolved Organic Nitrogen
- Total Dissolved Solids
- Total Suspended Solids
- Volatile Suspended Solids
- Silica
- Chloride
- Orthophosphate
- Total Phosphorus
- Chlorophyll



\*recently added

# Continuous Water Quality Monitoring

- Complements the discrete monitoring by providing real-time data using YSI 6600 sondes and Campbell data loggers
- Operational since 1983
- All data is available via California Data Exchange Center (<http://cdec.water.ca.gov>) or from Mike Dempsey at [MDempsey@water.ca.gov](mailto:MDempsey@water.ca.gov)
- Format is excel Spreadsheet
- Metadata is available at [www.water.ca.gov/rtm/meta/](http://www.water.ca.gov/rtm/meta/)



# Continuous Water Quality Monitoring

## •Parameters

- Water Temperature
- Specific Conductance
- Dissolved Oxygen
- pH\*
- Turbidity
- Fluorescence
- Air Temperature
- Solar Radiation
- Wind Speed and Direction
- Stage



Sacramento River at Hood



Sacramento River Between Chipps and Mallard Islands

\*recently added

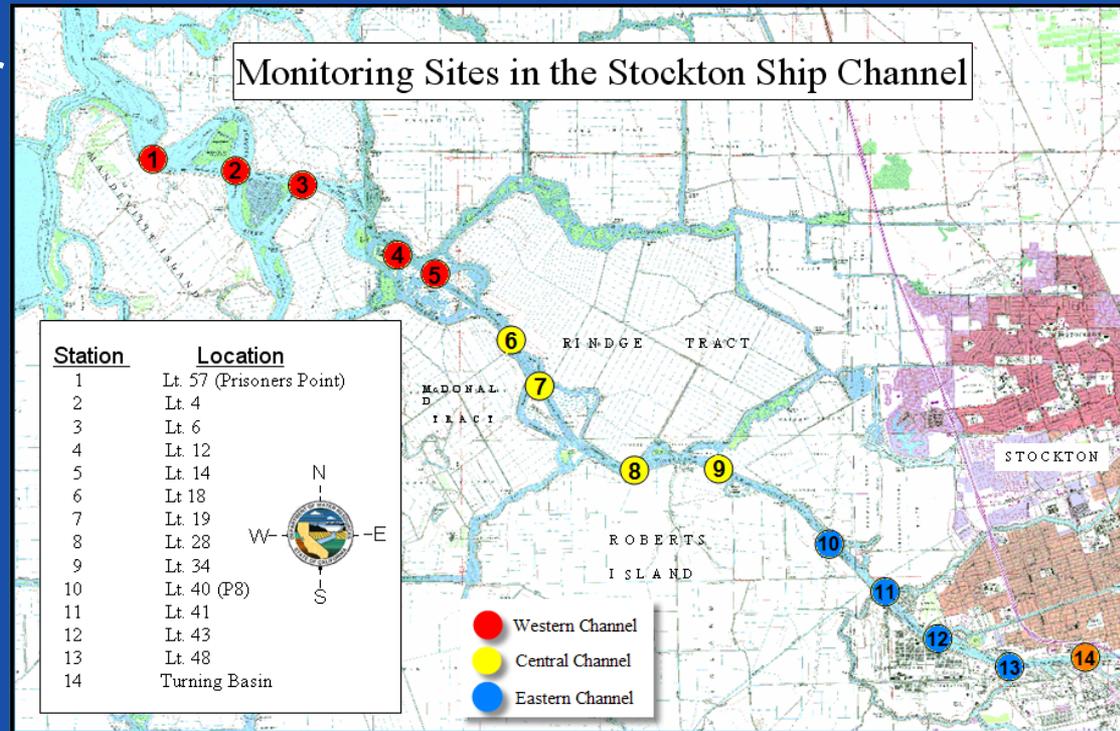
# Dissolved Oxygen Monitoring

- Monitoring began in 1968 as a result of low DO levels in the ship channel

- Compliance Monitoring for the Basin Plan and the Bay-Delta Plan

- Monitoring occurs June-December

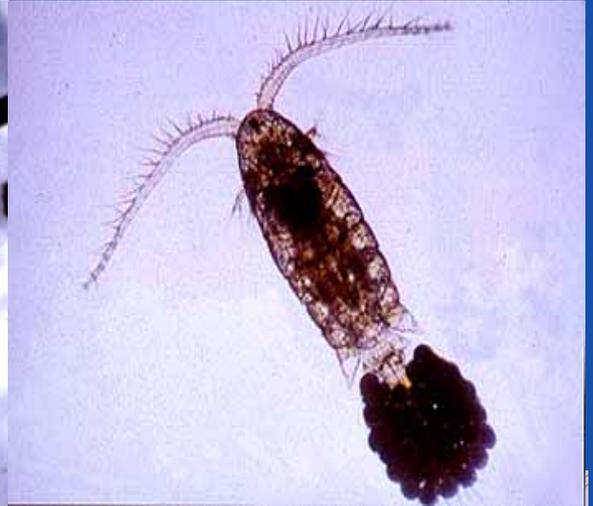
- Data format is excel Spreadsheet



- All data is available from Brianne Noble at [BNoble@water.ca.gov](mailto:BNoble@water.ca.gov)
- Metadata will be available soon
- Bimonthly crew chief report available via email

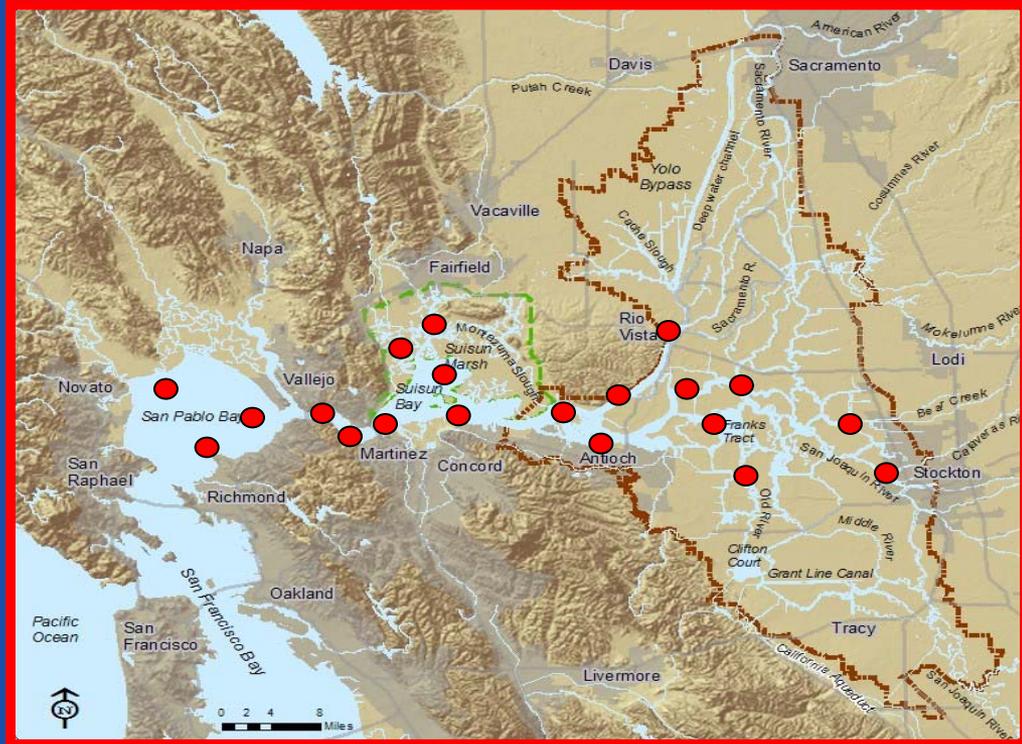
# Biological Monitoring

- Zooplankton
- Phytoplankton
- Benthos



# Zooplankton Monitoring

- Department of Fish and Game is the lead agency
- Monitor abundance and distribution of zooplankton
- Tows are monthly at high slack tide and conducted in tandem with the discrete water quality field runs

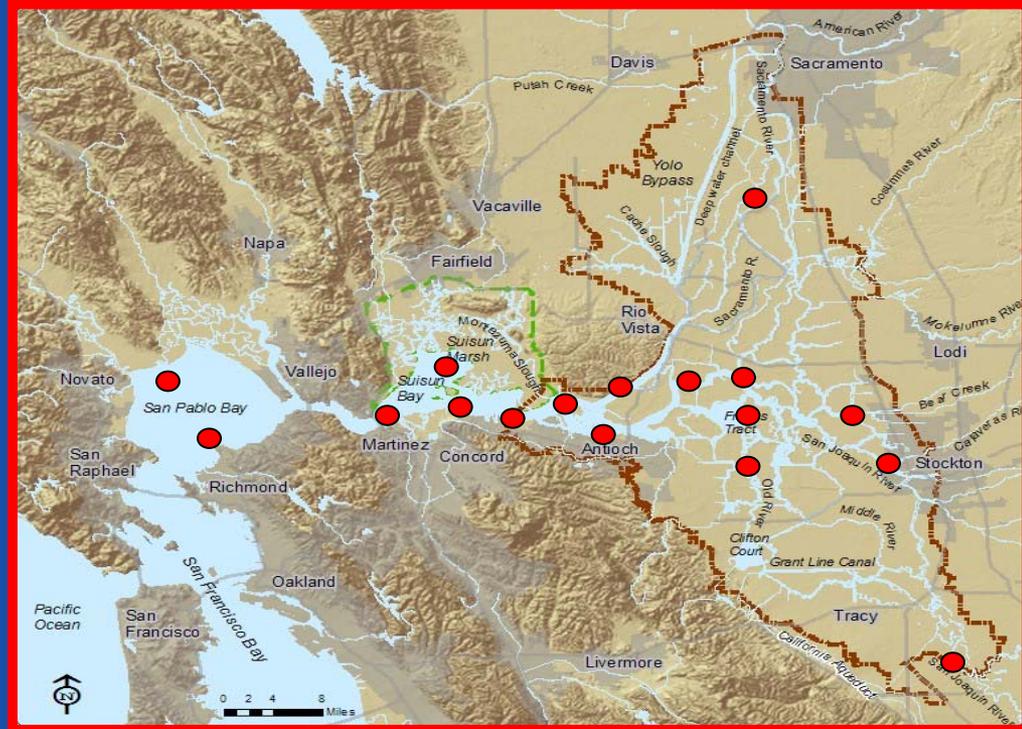


Plus two “floating” stations at bottom EC’s of 6000um and 2000um

- All data is available from April Hennessy at [ahennessy@dfg.ca.gov](mailto:ahennessy@dfg.ca.gov)
- Data format is excel spreadsheet
- Metadata is available at <http://www.water.ca.gov/bdma/meta/>

# Phytoplankton Monitoring

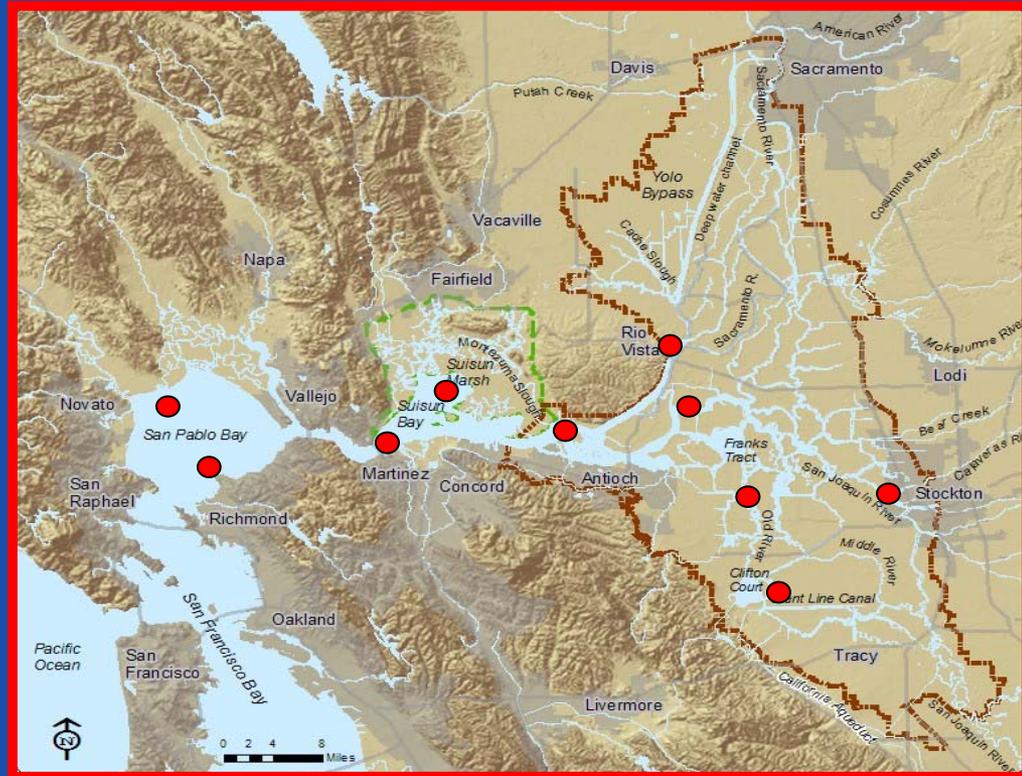
- Monitor abundance and distribution of phytoplankton
- Samples are taken monthly at high slack tide from 1 meter below the surface
- Samples processed by independent contractor (EcoAnalysts, Inc.)



- All data is available from Tiffany Brown  
Tbrown@water.ca.gov
- Data format is excel spreadsheet
- Metadata is available at  
<http://www.water.ca.gov/bdma/meta/>

# Benthic Monitoring

- Monitor abundance and distribution of benthos
- Sediment composition and benthic grab samples are taken monthly
- Samples processed by independent contractor (Hydrozoology, Inc.)



- All data is available from Heather Fuller  
HLFuller@water.ca.gov
- Data format is excel spreadsheet
- Metadata is available at  
<http://www.water.ca.gov/bdma/meta/>

# Data Contacts and Links

## Program Management

<http://www.water.ca.gov/bdma> & <http://www.water.ca.gov/iep/activities/emp.cfm>

Rich Breuer

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## Discrete Water Quality

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## Continuous Water Quality

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## Zooplankton Monitoring

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## Phytoplankton Monitoring

Tiffany Brown

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## Benthos Monitoring

Heather Fuller

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All Metadata can be found at <http://www.water.ca.gov/bdma/meta>

# EMP Staff (DFG, USBR and DWR)



Rachael August, Jay Aldrich, Sal Batmanghilich, Tiffany Brown, Rich Breuer, Mike Dempsey, Roberta Elkins, Wyatt Floerke, Heather Fuller, April Hennessey, Peggy Lehman, Brianne Noble, Michael Rayfuse, Dan Riordan, Nick Sakata, Eric Santos, Gregg Schmidt, Bill Templin, Nick van Ark, Scott Waller, Lisa Young and Edmund Yu.



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